

## 1. INTRODUCTION

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The Panel focused its efforts on understanding and reconstructing events and actions relating to Camp Lejeune's water contamination issue during the 1980–1985 period, but also evaluated the series of developments since that time (See Attachment C, Timeline of Events).

Camp Lejeune began sampling its drinking water system in 1980 in advance of Safe Drinking Water Act (SDWA) regulations that would set limits for total trihalomethanes (TTHMs) in drinking water. TTHMs are disinfection byproducts of the chlorination process that were suspected of causing cancer. In October 1980, laboratory analyses for TTHMs indicated the presence of volatile organic compounds (VOCs) other than TTHMs in Camp Lejeune's Hadnot Point water system. Additional TTHM analyses in 1981 also indicated the presence of VOCs at Hadnot Point. In August 1982, analyses of samples from the Hadnot Point and Tarawa Terrace drinking water systems identified varying concentrations of specific VOCs—trichloroethylene (TCE) and tetrachloroethylene (PCE). TCE is a degreaser that was widely used in equipment maintenance, and PCE is commonly used in dry-cleaning operations. Following systemic sampling of drinking water wells in 1984 as part of a new Navy environmental program, Camp Lejeune closed ten water supply wells in late 1984 and early 1985. (See Attachment D for key sampling data).

At the time that these VOCs were detected, the scientific community and water industry were aware that VOCs in drinking water were a growing concern. The U.S. Environmental Protection Agency (EPA) had not yet issued regulatory standards for TCE and PCE in drinking water; however, it had developed suggested no-adverse response level (SNARL) guidelines for both TCE and PCE. EPA's SNARLs for TCE were set at 2,000 micrograms per liter ( $\mu\text{g/L}$ ) for 1-day, 200  $\mu\text{g/L}$  for 10-day, and 75  $\mu\text{g/L}$  for a lifetime (70-year) exposure. SNARLs for PCE were set at 2,300  $\mu\text{g/L}$  for 1-day, 175  $\mu\text{g/L}$  for 10-day, and 20  $\mu\text{g/L}$  for lifetime exposure. One microgram per liter (one part per billion) is often described as about the amount of one drop of water in a swimming pool. In its guidelines, EPA also provided a brief description of the toxic properties of each compound. The agency published a proposed rulemaking in 1984 that recommended maximum contaminant levels (MCLs) for TCE and PCE and solicited public comment (EPA 49 FR 24330, 1984). Final regulations for MCLs of 5  $\mu\text{g/L}$  were established in 1987 for TCE and in 1989 for PCE.

In October 1989, Camp Lejeune was placed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or “Superfund”) National Priorities List (NPL) (EPA, 54 FR 41000, 1989). By law, ATSDR conducts a public health assessment for sites listed or proposed for the NPL. ATSDR made its initial visit to Camp Lejeune in 1991 as part of its assessment, and the Marine Corps began providing information to the Agency. In the final public health assessment released in 1997, ATSDR determined that exposure to contaminated drinking water was not likely to cause adverse health effects in adults but recommended a study of children whose mothers may have been exposed to VOCs during pregnancy by drinking Camp Lejeune water (ATSDR, 1997). In 1998, ATSDR published its report discussing possible associations between contaminated drinking water at Camp Lejeune and the size and weight of infants born to parents who lived in base housing (ATSDR, 1998). ATSDR then recommended a larger survey of children born between 1968 and 1985 to women who lived at Camp Lejeune during their pregnancy. ATSDR initiated the survey in 1999 and determined there was adequate information to conduct an epidemiological study, which is currently ongoing (ATSDR, 1999).

In March 2004, the Commandant of the Marine Corps released a “Charter for the Fact Finding Panel to Review Issues Surrounding the Camp Lejeune Water Supply from 1980–1985.” The Panel began work and held its first meeting in April 2004. As mandated by its Charter, the Panel focused primarily on the period from 1980 to 1985. This timeframe began with the initial detection of VOCs in one Camp Lejeune drinking water system and concluded with the closure of VOC-contaminated wells in two drinking water systems in late 1984 and early 1985.

The Panel’s objective was to collect as much information as possible to answer the following questions:

- What were the decisions that followed the initial detection of VOCs in the Hadnot Point and Tarawa Terrace drinking water systems?
- Who made those decisions, and what were the reasons for making them?
- Were the decisions reasonable considering the regulatory environment, technical and industrial knowledge, and the standard operating practices of water system operators during the period?

To address this objective in a comprehensive manner, the Panel completed the following actions:

- Made an extensive effort to obtain all relevant data.
- Identified and reviewed relevant documents on the administrative history of the contamination issue from Camp Lejeune; the Marine Corps; federal, state, and local government agencies; and private entities.
- Interviewed individuals associated with, or with knowledge of, Camp Lejeune's water supply system, the base's environmental management program, and other environmental issues to obtain first-hand information on the 1980–1985 period and subsequent years.
- Solicited comments of concerned citizens through a public meeting and other communications.
- Obtained published literature from the regulatory, technical, and scientific community regarding groundwater contamination (TCE and PCE) and treatment issues during the 1980–1985 period. The Panel researched published literature to determine what information was available discussing the toxic properties of TCE and PCE that, if known by those responsible, might have influenced decisions made by Camp Lejeune's leadership in the 1980–1985 period.
- Used the Panelists' professional knowledge regarding drinking water treatment, groundwater contamination, regulatory actions and their evolution, the progression of scientific understanding about the toxic properties of TCE and PCE, and military drinking water systems and groundwater practices.

The Panel's specialized knowledge was useful in analyzing Camp Lejeune's actions during the time period when the base began to realize its drinking water wells were contaminated with VOCs. The Panelists have specific expertise in:

- Drinking water treatment in the 1980s,
- Public perceptions regarding contamination of groundwater and drinking water,
- Water industry practices related to unregulated substances,
- Formal and informal regulatory activities and initiatives, as well as their evolution,

- Scientific understanding about the toxic properties of the chemicals of interest and the development of this understanding, and
- Procedures and policies followed by the military, particularly the Marines.

Together, the approaches and information sources described above provided a comprehensive record of the events and decisions made at Camp Lejeune and common practices in the water industry during the period 1980-1985. The Panel focused on the detection of VOCs in some drinking water wells at Camp Lejeune and the responses of Camp Lejeune's leadership and staff to managing the base's water quality and assuring the safety of the water provided to base residents.

Although the Panel was not tasked with evaluating the potential adverse health effects claimed by former Camp Lejeune residents, the Panel believed it was appropriate to acquire a basic knowledge of the health effects associated with TCE and PCE. In addition, the Panel visited Camp Lejeune and observed its water supply systems in order to understand how the systems operated in the 1980s.

The following section details the approach the Panel took to identify and acquire relevant information.

## **1.1 Document Collection**

The Panel compiled over 1,600 documents related to this study and reviewed the most relevant documents to obtain pertinent information and identify individuals, both military and civilian, with knowledge of Camp Lejeune's drinking water contamination issue. Approximately 660 Marine Corps documents used in the ATSDR's public health assessment were included in this review.

The Panel began acquiring documents at the May 10, 2004, meeting at Camp Lejeune, which also allowed Panelists to observe the base's water systems first-hand. At this meeting, base personnel introduced the administrative record for the 1980-1985 period, discussed the background for the Panel's inquiries, detailed the type and number of available records, and described the rationale for its records search. The Panel believes that the incompleteness of documentation available for this study is the result of the Marine Corps' record retention policies and the loss of records during over

20 years of storage. Marine Corps leadership at all levels encouraged the Panel to seek relevant information from other sources in order to supplement the core information provided by the base.

The Panel submitted requests for documents under the Freedom of Information Act (FOIA) to the North Carolina Department of Environment and Natural Resources' (NCDENR) Hazardous Waste and Superfund departments, the EPA's Headquarters and Region IV offices, and the U.S. Geological Survey (USGS) to ensure that all relevant documents were collected. The Panel also requested any relevant information from the Bureau of Naval Medicine (BUMED), the Navy Environmental Health Center (NEHC), Atlantic Division Naval Facilities Command (LANTDIV), and the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM).

The Panel requested documentation related to the TCE or PCE contamination at Camp Lejeune and/or ABC Cleaners (ABC Cleaners, an off-site drycleaner, was the source of PCE contamination in the Tarawa Terrace drinking water system); background information on TCE and PCE; and standards, regulations, codes, directives, or other similar requirements in place regarding TCE or PCE in drinking water through 1985. The Panel also requested that concerned citizens provide relevant documentation for review.

Documents obtained through these processes were reviewed, summarized, coded and entered into an electronic database as described in Section 1.4, Body of Evaluated Information.

## **1.2 Personal Interviews**

The Panel conducted 25 interviews with key individuals who may have had knowledge of the Camp Lejeune groundwater contamination issue during the 1980–1985 period. The Panel was particularly interested in obtaining insights from individuals who had first-hand knowledge of the potential contamination, including personnel from Camp Lejeune's Environmental Division, government agencies, and environmental laboratories and how Camp Lejeune's chain of command responded to that information. The Panel was mindful that base personnel depended on other organizations for information on which to base decisions or for explicit guidance. The Panel considered information from these sources to helpful in providing a comprehensive understanding of decisions made during 1980-1985 and the rationales behind them. The Panel identified several individuals in Naval

Facilities Engineering Command Atlantic Division (LANTDIV) whom it hoped could provide these insights. A list of individuals is provided in Attachment E.

The Panel also identified and interviewed several former residents who had personally researched the water contamination issue, requiring the Panel to differentiate beliefs of exposure from knowledge of the Marine Corps' actions during the early 1980s. The Panel continuously updated its list of interviewees as the document reviews, interviews, and concerned citizen solicitations progressed.

The Panel retained a licensed investigator with expertise in environmental issues and conducting interviews to locate and interview individuals it believed could provide relevant information. Due to the passage of more than two decades, however, the investigator was unable to locate all individuals initially sought. In addition, some individuals declined either to be interviewed or declined a second interview requested to clarify information. The Panel's absence of legal authority precluded its ability to compel testimony.

### **1.3 Solicitation of Concerned Citizen Comments**

The Panel conducted a publicized, two-day public meeting on June 24–25, 2004, at Coastal Carolina Community College in Jacksonville, North Carolina, to receive comments and documentation from former residents of Camp Lejeune and other interested members of the public related to the water contamination issue. The public meeting provided the Panel with the opportunity to discuss its work with these concerned citizens. Although participants addressed the issues within the Panel's focus and offered insights into past methods of waste disposal at the base, most comments focused on health effects claims and individual issues outside the scope of the Panel's mandate. As stated previously, the Panel separated health effects beliefs from knowledge of the Marine Corps' decisions and actions. The Panel received submissions and letters from concerned citizens throughout its review, including additional documentation, suggestions for potential interviewees, and comments on the direction and scope of the Panel's review. See Attachment F for a list of presenters.

### **1.4 Body of Evaluated Information**

The Panel solicited extensive documentation from a wide range of sources to conduct a comprehensive study about TCE and PCE, Camp Lejeune's use and handling of these chemicals,

and environmental issues associated with these VOCs in drinking water wells at Camp Lejeune through 1985. Many sources provided duplicate documents. USGS provided several reports related to Camp Lejeune, but the reports were not pertinent to the Panel's mission. Other agencies were not able to provide relevant documentation. BUMED referred the Panel to the Marine Corps, and NEHC stated that it had no information on TCE, PCE, or Camp Lejeune documents authored prior to 1992. EPA's Region IV office stated that its Water Management Division had no records in response to the Panel's FOIA request for information on ABC Cleaners.

All documents retrieved by the Panel were systematically organized and archived, along with summary reviews. These documents were organized into the 15 categories shown in Attachment G.

## **1.5 Review process**

The Panel reviewed a large volume of information over a relatively brief time. The Panel's support contractor summarized data to facilitate a broad and detailed understanding of the facts. Reviewers examined documents to extract pertinent information for further analysis or incorporation into the final report and assigned a significance ranking to assist with subsequent reviews. The examination process consisted of an initial review to identify potential interviewees and organizations to contact. Documents then received a primary and secondary review to identify important content, focusing on key issues and questions, such as the knowledge and actions of individuals and organizations associated with the water contamination issue, the Marine Corps' knowledge and response to the contamination, and the level of scientific and industry information available to personnel in Camp Lejeune's Environmental Division.

The Panel was required to make judgments about the quality and comprehensiveness of the documents. The scientific literature on the history and health effects of TCE and PCE, as well as water industry reports on the detection of these chemicals and approaches to treating water contaminated with them, was considered highly accurate and reliable. The availability of this information was not, however, taken as indicative of the level of knowledge of Camp Lejeune's Environmental Division regarding TCE and PCE. The documentation on the operation of Camp Lejeune's drinking water supply system, its Environmental Division and this office's communications with other organizations was not complete. Panelists considered this information usable, however, and are confident that it provided adequate and accurate facts that support the

findings of this report. Panelists viewed the records of interviews with key individuals associated with Camp Lejeune's drinking water system and environmental monitoring program, as well as some former residents, as valuable in providing insights into events and decisions in the 1980–1985 period. The Panel recognized that interviews varied in their usefulness depending on the individuals' recall of events after more than two decades and their level of willingness to fully discuss their involvement.

The Panel held numerous meetings and conference calls to discuss the information and reach a consensus regarding the findings of the study and recommendations for future action. This report, developed for submission to the Commandant of the Marine Corps, summarizes the Panel's findings and recommendations. Throughout its work, the Panel functioned independently of the Marine Corps, and to ensure maximum independence, no draft of this report was shared with the Marine Corps.

This report is intended to present the Panel's activities and findings in a structure that is helpful to the reader. Key elements of the body of the report are summarized in the Executive Summary. Section 1, Introduction, describes in detail the Panel's activities and approach to fulfilling its charge. Section 2, Historical Perspective, contains information on the regulatory framework and toxicology of TCE and PCE and a discussion of water supply industry practices during the early 1980s. Section 3, Findings on Camp Lejeune, assesses the Marine Corps' organizational structure and specific details surrounding the base's sampling and analysis and subsequent closure of wells in Hadnot Point and Tarawa Terrace.